

EFFECT OF CONCEPT MAPPING ON STUDENTS' RETENTION IN ENGLISH GRAMMAR

ESTHER N. OLUIKPE & CHIBUZO C MBA

Department of Arts Education, University of Nigeria, Nsukka, Nigeria

ABSTRACT

This study explored the effect of concept mapping on students' retention in English grammar. It employed a quasi-experimental research design of the pretest posttest non equivalent control group design. Two instructional packages were used for this study. The first is the concept mapping based package which was used for the treatment group while the second package is the conventional instructional package which was used for the control group. Four intact classes drawn from four schools in one Educational zone of Enugu State in Nigeria were used for the study. Two intact classes from two schools were assigned to the treatment group while the remaining two intact classes were assigned to the control group. The assignment of classes to treatment and control groups was achieved through a simple random sampling. Data were collected using the English Language Grammar Achievement Test. The data were analyzed using mean, standard deviation and the Analysis of Co-variance. The study revealed that concept mapping enhances retention of English grammar among secondary school students in Nigeria. Based on the finding, the researcher concludes that concept mapping is an effective tool for grammar retention.

KEYWORDS: Concept Mapping, English Grammar, Teaching Method, Retention

INTRODUCTION

Developed by Novak (Novak, 2008) and inspired by Ausubel's assimilation theory (Novak & Canas, 2008) also known as theory of subsumption (Brown, 2007), concept mapping is a teaching tool for avoiding learning concepts by rote. Ausubel's theory of assimilation/subsumption, according to Brown (2007), attempts to establish a relationship between given and new experiences in order to facilitate the restructuring of given and new information to enable retention. By this process, learning by rote is controlled. Thus, Ausubel's theory forms the underlying theory for the construction of concept mapping. According to Walker (2002), concept mapping is used for presenting, reviewing, and evaluating materials taught in class. In terms of its form, Novak (2008) and Novak & Canas (2008) see it as a graphic representation of knowledge. Calvo, Arruate, Elorriaga, Larrañaga & Conde (2011) represent it as a graphic representation of knowledge comprising of nodes and links organized to reflect the domain of information. Nodes symbolize concepts and links reflect relationship between concepts. Meijers (2012) describe it as a graphical tool for organizing and representing knowledge. Finally, Walker (2002) sees concept mapping as a process of creating a visual organizer that helps students to represent a topic/concept by showing relationship. In these definitions, two key phrases are crucial to the understanding of concept mapping-- *graphic representation and establishment of relationship*.

Thus, concept mapping may be operationalized to mean a teaching tool that shows relationships between concepts through the use of graphic presentation. The pedagogical value of concept mapping lies in its use to establish relationship in concepts/topics to enhance retention which, in turn, improves achievement in learning.

Retention may be impeded when, according to Krashen's (1977) affective hypothesis, the learner's affective filter is high. A high affective filter leads to a mental block (Linguaprof, 2010) resulting from anxiety. This type of anxiety is referred to in the literature as *language anxiety* (Horwitz, 2001 & Oxford, 1999). Concept mapping has, therefore, another pedagogical value. It lowers affective filter by creating interest in the learner to learn.

Some reasonable level of interests have been generated in research on concept mapping especially in postgraduate research to determine the efficacy of concept mapping in retention, achievement, and interest in various subjects. Although it was originally designed for the study of the Sciences, research in concept mapping has extended to the Social Sciences and the Humanities. Sample studies on concept mapping include, among others, Okefiena (1999) which focused on its effect on students' achievement and interest in Biology; Onyeneto (2000) on students' achievement and retention in Economics; Imoko (2005) on students' achievement and interest in Trigonometry; Ezekannagha (2007) on students' achievement in Integrated Science; Eneasato (2010) on students' achievement and retention in Geography; Calvo et al. (2011) on its use to promote meaningful learning, creativity, and collaboration in Computer Engineering; and Idu (2012) on its use in teaching and evaluation in the teaching of Government in Senior Secondary schools in Nigeria. All of these studies in various ways reveal that concept mapping facilitates achievement, retention, interest, creativity in the areas investigated. These studies are in the area of Sciences and Social Sciences. Only one study in the area of English grammar is available to us. It is Nada (2008) which focused on the use of concept mapping to teach conditional sentences, voice, and complex tenses. This study, like those in the Sciences and Social Sciences, revealed that concept mapping facilitated retention and achievement in the concepts learnt.

Against the above background, the purpose of this study is to determine the effect of concept mapping on secondary school students' retention in English grammar with specific reference to verb, tense, and clause.

METHODS

The study employed quasi-experimental research design. Specifically, it employed pretest posttest non-equivalent control group design. This design suits the study because there was no randomization of subject rather intact classes were used as experimental and control groups. The sample used for this study consisted of 407 secondary students (156 boys and 251 girls) comprising four intact classes of schools in one of the Educational zones of Enugu State in Nigeria. Enugu State is one of the States constituting the South-east geopolitical zones in Nigeria. Its capital is Enugu. Stratified random sampling technique was used to draw four schools from the educational zone. Two schools were assigned to experimental group (concept mapping strategy of instruction) and the other two were assigned to control group (conventional lecture method) through toss of a coin.

Data were generated, using a self-developed instrument tagged *English Grammar Achievement Test* (EGAT). EGAT is a thirty -item – instrument, made up of multiple choice questions with three response options labeled A-C. See Appendix A. The multiple choice test was developed from the topics in the scheme of work for study and was used for the pretest, posttest, and retention tests. The items in the EGAT used for pretest were reshuffled for use as posttest and later reshuffled and used as retention test.

The instructional package used for the study were concept maps (see Appendix B for sample) and lesson plans. A total of nine concept maps were developed, using The Institute for Human Cognition Concept map (IHMC) tools. Following Novak & Alberto (2006), the construction of the maps were guided by the following principles:

- The topic
- Identification of key concepts (general, intermediate and specific)
- Construction of maps

A total of fourteen lesson plans one for each lesson were developed. They were based on the aspects of grammar covered (verb, tense and grammar). Their examples and functions were highlighted in the lesson development. The lesson plan for the treatment group was modelled after concept mapping while the control group reflected the use of lecture method.

Before the treatment, the subjects were given a pretest which was administered by the regular English language teachers in the sampled schools who had undergone training in the research procedure. The pretest was used to:

- Determine the students' initial knowledge of the topics for study
- Determine the comparability of the two groups (experimental and control) with respect to their achievement in the pretest.

The treatment for the study was teaching of the selected topics to the subjects, using the two methods. The experimental groups were taught using concept mapping while the control groups were taught, using the lecture method. Teaching lasted for six weeks and was done during the normal class period in order to attract the interest and attention of the subjects. The regular English language teachers, who had been trained for this purpose, were used for the teaching to avoid the subjects being alienated by the presence of a strange teacher. The treatment groups were subjected to concept mapping strategy. The objectives of the lesson were spelt out for each topic. The teacher introduced each topic and used the concept maps to explain and illustrate it. Thereafter, members of the group were involved in practicing the mapping process. At this point in time, the teacher went round the class inspecting the efforts of the subjects and correcting the subjects where and when necessary.

The lecture method was used in teaching the control group. The teachers verbalized the relevant concepts and their principles during the lesson, initiated and encouraged group discussion in the course of the teaching. The subjects watched, listened, discussed within the group and took down relevant notes. The teaching of both experimental and control groups were done, using prepared lesson notes.

At the end of the treatment, a post EGAT was administered to the same subjects. Two weeks later, retention test was administered, using the reshuffled post EGAT. The scores for both treatment and control group were recorded accordingly. Each item in the test scored one mark. The maximum mark was 30 while the minimum mark was zero. Since the tests were of the objective type, one of the researchers scored them. Data were analyzed, using mean and standard deviation to answer the research question. Analysis of Covariance (ANCOVA) was used to test the hypothesis formulated for the study at 0.05 level of significance. ANCOVA was used to partial out the initial difference in the ability levels among the research subjects. The pretest scores were used as covariates for achievement and retention.

FINDINGS

The following research question and hypothesis guided the study:

Research Question

What are the effects of concept mapping on students' retention in English grammar?

Table 1: Mean Score and Standard Deviation of Posttest – Retention Test of the Subjects' Achievement in English Grammar

Group	Number	Posttest		Retention Test		Gain
		Mean	SD	Mean	SD	
Experimental (concept Mapping)	214	14.40	3.65	16.49	3.64	2.09
Control (Lecture)	193	11.19	2.41	12.29	12.29	1.10

The posttest and retention test mean scores of the subjects' taught with concept mapping are 14.40 and 16.49 with mean gain of 2.09 and standard deviation of 3.65 and 3.64 respectively, while the posttest and retention test mean scores of subjects' taught with lecture method are 11.19 and 12.29 with mean gain of 1.10 and standard deviation of 2.41 and 12.29 respectively. These mean gains show that subjects taught with concept mapping retained higher than those taught with lecture method.

In order to determine if there is any significant difference on subjects' retention based on the use of concept mapping and lecture method in teaching English grammar to the subjects, the following hypothesis was tested.

H₀

There is no significant difference in the mean retention score of the subjects in English grammar when exposed to concept mapping strategy and conventional method.

Table 2: ANCOVA of Students Retention Mean Scores in EGAT (by Treatment and Gender)

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Decision
Corrected Model	2321.520*	4				
Intercept	2195.352	1	580.380	58.296	.000	
Posttest	513.850	1	2195.352	220.510	.000	
Group	728.072	1	513.850	51.613	.000	Significant
Gender	17.289	1	728.072	73.130	.000*	Not Significant
Method * Gender	.187	1	17.289	1.737	.188**	Not Significant
Error	4002.229	402	.187	.019	.891**	
Total	91881.000	407	9.956			
Corrected Total	6323.749	406				

* = Significant at 0.05 level

** = Not Significant at 0.05 level

From Table 2, the F – calculated for teaching method was 73.130 and this is significant beyond the probability level of 0.05. The null hypothesis is rejected. This shows that there is significant difference between the mean retention scores due to the two teaching method in favour of concept mapping technique.

DISCUSSIONS

The finding of this study showed that concept mapping significantly enhanced the retention of students in English grammar. This finding corroborates with the studies Okefiena (1999), Onyeneto (2000), Imoko (2005), Ezekannagha (2007), Nada (2008), Eneasato (2010). This might be attributed to the fact that concept mapping as a graphic representation of the concepts taught, led to thoughtful reflection on the learning experiences that enhance retention. This is because what one sees he remembers, what he hears he may forget (Chinese proverb). Since concept mapping is highly a learner-centered approach to problem solving and also, places the responsibility of learning directly on the students, it potentially enhances the students' retention especially as the students were led to construct what they understood in each learning experience.

CONCLUSIONS

This study concludes that concept mapping has significant effect on students' retention in English grammar. This shows that concept mapping appears to be more efficacious than the lecture method in the improvement of students' retention for the recalling of what is learnt in difficult content areas of English grammar.

EDUCATIONAL IMPLICATION OF THE STUDY

The conclusion drawn from this study has pedagogical implications. Since concept mapping has relative efficacy in students' retention of learned tasks and such efficacy implicates improved achievement in learned tasks, it, therefore, provides the basis upon which English language teachers could build to enhance the efficacy of their instructional practices for effective retention and recalling of learned tasks to improve students' performance. Thus, concept mapping should be integrated into the English grammar instructional modules.

ACKNOWLEDGEMENTS

This is a revised excerpt from an MEd thesis conducted by Mrs. Chibuzo C. Mbø on concept mapping and supervised by Dr. Esther N. Oluikpe. We, therefore, acknowledge the editorial assistance of Professor Benson Oluikpe in this work.

REFERENCES

1. Ausubel, D. (2005). *Active learning theories (constructivism) and teaching strategies*. Retrieved from <http://www.asa3.org/.../active.htm> on March 8, 2012.
2. Brown, H. D. *Principles of language learning and teaching*. New York: Pearson/Longman.
3. Calvo, I., Arruarte, A., Elorriaga, J. A., Larrañaga, M., & Conde, A. (2011). *The use of concept maps in computer engineering to promote meaningful learning, creativity and collaboration*. Retrieved from <http://galan.ehu.es/galan/node/483> on March 8, 2012.
4. Eneasato, C. J. (2010). *Effect of concept mapping on students' achievement and retention in geography*. Ph. D. Thesis, University of Nigeria, Nsukka.
5. Ezekannagh, G.N. (2007). *Effects of concept mapping and cognitive styles on achievement of students in integrated science*. Ph. D. Thesis, University of Nigeria, Nsukka.
6. Horwitz, E. (2001). Language anxiety and achievement. *Annual Review of Applied Linguistics*, 21, pp.112-126.
7. Idu, G. O. (2012). Concept mapping as a strategy for teaching and evaluating government in senior secondary school: Implication for educational transformation. *International Journal of Educational Research*, 11(1), pp.54-60.
8. Imoko, B. I. (2005). *Effect of concept mapping on students achievement and interest in trigonometry*. Unpublished PhD Thesis, University of Nigeria, Nsukka.
9. Krashen, S. (1977). The monitor model for adult second language performance. In M. Burt, H. Dulay & M. Finocchiaro (Eds), *Viewpoints on English as a second language* (pp. 152-161). New York: Regents Publishing Co.

10. Linguaprof, R. (2010). *Theories of second language learning*. Retrieved from <http://www.slideshare.net/linguaprof/theories-of-second-language-learning> on March 8, 2012.
11. Mba, C. C. (2013). *Effect of concept mapping on the students' achievement and retention in English grammar in Obollo educational zone, Enugu*. Unpublished MEd Thesis, University of Nigeria, Nsukka.
12. Meijers, A. K. (2012). *Knowledge modeling*. Retrieved from http://www.ied.edu.hk/apfslt/v.13issue_1/jena/page3.htm on April 2, 2012.
13. Nada, M, K. A. (2008). *The effect of using concept maps on achieving English grammar among ninth graders in Gaza governorate*. Retrieved from <http://library.iugaza.edu.ps/thesis/82398.pdf> on April 2, 2012.
14. Novak J. D. (2008). *The origin of concept mapping tool and the continuing evolution of the tool*. Retrieved from <http://cmap.ihmc.us/publication/researchpdf> on April 2, 2012.
15. Novak, J. D.& Alberto, J. C. (2006). *Technical report (IHMC) map tools*. Pensacola, Fl.: Institute for Human and Machine Cognition.
16. Novak, J. D. & Canas, A. J. (2008). *The theory underlying concept maps and how to construct and use them*. Retrieved from <http://cmap.ihmc.us> on April 2, 2012.
17. Okefiena, D. N. (1999). *The effect of concept mapping on students' achievement and interest in some units of biology*. Unpublished PhD Thesis, University of Nigeria, Nsukka.
18. Onyeneto, L.O. (2000). *A comparative study of concept mapping and conventional methods of instruction on students' achievement and retention in economics*. Unpublished MED Thesis, University of Nigeria, Nsukka.
19. Oxford, R. (1999). Anxiety and the language learner: New insights. In J. Arnold (Ed), *Affect in language learning* (pp.58-67). Cambridge: Cambridge University Press.
20. Walker, G.H. (2002). *Concept mapping and curriculum development*. Retrieved from <http://www.utc.edu/Administration/WalkerTeachingResourceCenter/FacultyDevelopment/ConceptMapping/> on March 8, 2012.

APPENDICES A

ENGLISH GRAMMAR ACHIEVEMENT TEST (EGAT)

Instruction: Answer All Questions Time: 1 hr

SECTION A: Each item in this section contains options lettered A-C. Circle the option that bears the right grammatical name and function for the underlined.

1. If you helped me, I shall be happy.
 - a. Noun clause subject of the verb phrase 'shall be'
 - b. Adverbial clause modifying the verb phrase 'shall be'
 - c. Adjectival clause qualifying the pronoun 'I'
2. I met the writers several of whom were medical doctors.
 - a. Noun clause object of the verb 'met'
 - b. Adverbial clause modifying the verb 'met'
 - c. Adjectival clause qualifying the noun 'writers'
3. She left the school as she could not cope with the financial involvement.
 - a. Noun clause object of the verb 'left'

- b. Adverbial clause modifying the verb 'left'
 - c. Adjectival clause qualifying the pronoun 'she'
4. My worry is whether I shall pass the exam.
- a. Noun clause complement of the subject 'my worry'
 - b. Adverbial clause modifying the verb 'is'
 - c. Adjectival clause qualifying the noun 'worry'
5. I believe that love is blind.
- a. Noun clause object of the verb 'believe'
 - b. Adverbial clause modifying the verb 'believe'
 - c. Adjectival clause qualifying the pronoun 'T'
6. The man who invited you for dinner is my principal.
- a. Noun clause complement of the verb 'is'
 - b. Adverbial clause modifying the verb 'is'
 - c. Adjectival clause qualifying the noun 'man'
7. Where there is will, there is hope.
- a. Noun clause object of the verb 'is'
 - b. Adverbial clause modifying the verb 'is'
 - c. Adjectival clause qualifying the noun 'way'
8. I have seen the place which you described.
- a. Noun clause subject of the verb phrase 'have seen'
 - b. Adverbial clause modifying the verb phrase 'have seen'
 - c. Adjectival clause qualifying the noun 'place'
9. That she won the prize is no longer news.
- a. Noun clause subject of the verb 'is'
 - b. Adverbial clause modifying the verb 'is'
 - c. Adjectival clause qualifying the noun 'news'
10. Chy left early that she may reach on time.
- a. Noun clause object of the verb 'left'
 - b. Adverbial clause modifying the verb 'left'
 - c. Adjectival clause qualifying the noun 'Chy'

SECTION B: Choose from the option lettered A-C and fill in the blank spaces with the appropriate verb form.

Most cigarette smokers who 11 to cigars 12 that they 13 and therefore 14 safe from the hazards of tobacco smoke. But one of the studies by doctors at Central Hospital, London 15 that heavy smokers 16 to inhale deeply even when they 17 cigars. When a person 18, the hemoglobin in his blood 19 with some carbon monoxide in the smoke to form a substance which 20 blood from performing its normal function: carrying oxygen.

Table 3

	A	B	C
11	switches	switch	switched
12	believes	believe	believed
13	does not inhale	do not inhale	did not inhale
14	is	are	were
15	shows	show	shown
16	tends	tend	tended
17	smokes	smoke	smoked
18	inhales	inhale	inhaled
19	combines	combine	combined
20	prevents	prevent	prevented

SECTION C: Choose from the option lettered A-C the most appropriate tense to fill in the gaps.

Some weeks ago, a teacher 21 that one of my students 22 her assistant on a topic that has 23 her worries since she

24 teaching English language. The student 25 eager to assist her but 26 for her consent. I was trying to think about what to say when she ended up screaming abuses on the student. I 27 quietly, thought and concluded that half education 28 really a sickness because 29 30 many odds but that was obviously strange.

Table 4

	A	B	C
21	requests	requested	requesting
22	gives	gave	given
23	gives	gave	giving
24	starts	started	starting
25	is	was	are
26	demands	demanded	demanding
27	sits	sat	sitting
28	is	was	were
29	has	had	have
30	sees	saw	seen

APPENDIX B

Sample Concept Map

- Concept Map of Finite Verb

